



UK-Norway Initiative on Nuclear Warhead Dismantlement Verification: A NWS-NNWS Cooperation

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What conditions exist for NWS-NNWS Cooperation?

- NPT Article VI: **Each** of the **Parties** to the Treaty undertakes to pursue **negotiations** in good faith on **effective measures** relating to the cessation of the nuclear arms race at an early date and to **nuclear disarmament**, and on a treaty on general and complete disarmament under strict and **effective international control**.
- Bi/Multilateral research into nuclear warhead dismantlement verification technology is nothing new:
 - US-RUS Black Sea Experiment (1989)
 - IAEA-RUS-US Trilateral Initiative (1996)
- UK-Norway Initiative: The **first time** ever a **NWS** (UK) and a **NNWS** (Norway) **collaborates** in the field of nuclear warhead dismantlement verification.

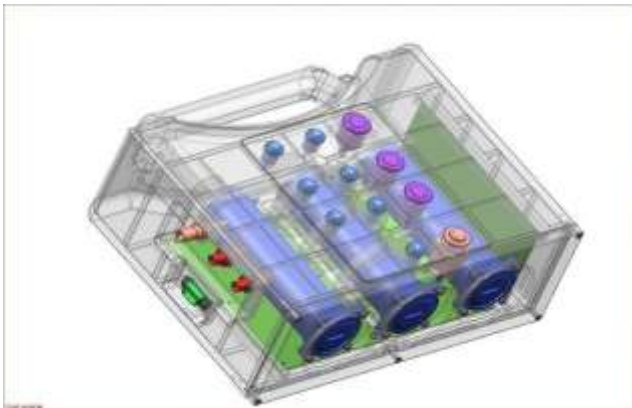
Is NNWS verification of NWS disarmament processes possible?

- **Investigate relevant verification inspection procedures and technologies**
 - Address NPT Article I & II (non-proliferation principles)
 - Enable verification of nuclear disarmament without revealing proliferative information
- **Other requirement:**
 - Keep scientific and technical nature of the project
- **Project Partners:**
 - **UK:** MoD, AWE plc
 - **NOR:** FFI, IFE, NRPA, NORSAR
 - **NGO:** VERTIC



Project Elements

- **Managed Access: Develop Procedures & Techniques for NNWS Access to NWS weapon facilities**
 - Monitoring Visit Exercise of a mock-up 'nuclear weapons complex', Norway, June 2009.
- **Information Barrier (IB) system: Device used to measure agreed weapon attributes & values**
 - Tool needed for successful implementation of a chain of custody without revealing weapons attributes and characteristics.



Project timeline

- **Project planning activities (2007/2008)**
 - Develop technology, facility infrastructure, inspection procedures and necessary documentation
- **Monitoring visit (June 2009)**
 - Full scale exercise in verification of dismantlement of a mock-up nuclear weapon, making use of both:
 - Managed Access procedures
 - Information Barrier system
- **Wash-up of lessons learned (October 2009)**
- **Summing up findings (present)**



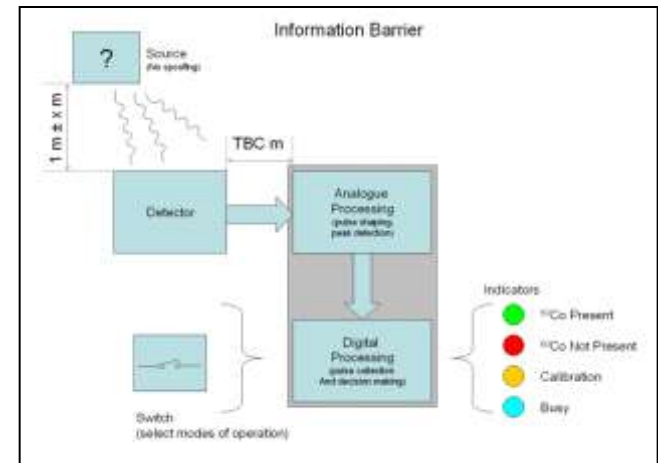
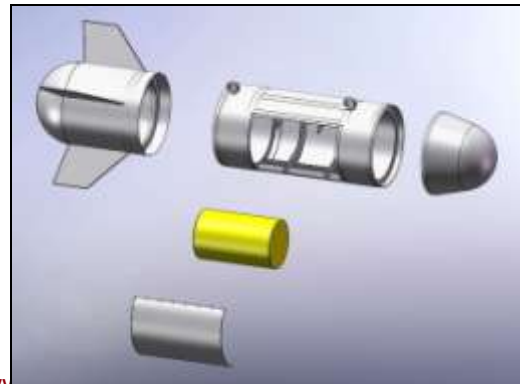
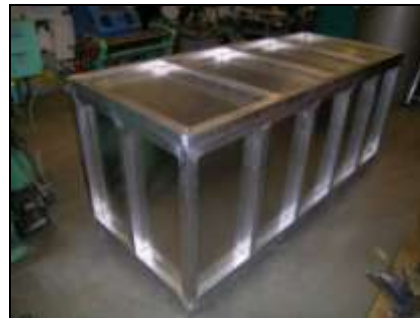
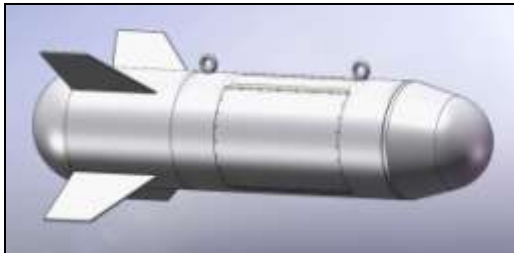
The Requirement

- Verification Inspectors are faced with items like these. Without looking inside the container, how do they know what's in it?



Project Equipment

- Mock-up nuclear weapon with a Co-60 source simulating fissile material
- Weapon transport containers
- Information barrier system:
 - Two prototypes IB designed to measure radioactive signatures in gamma ray emissions.



Inspection Equipment

- Tags and Seals - w/different patterns
- Special camera
- Laptop and software to check images



Initial Challenges

- Managing proliferation concern:
 - Swapping roles (UK/Norway team)
 - Exercising on Norwegian research sites
 - VERTIC as neutral observer
- Difficulties managed through:
 - Trust and determination
 - Good relationship
 - Careful planning of a realistic scenario



Some Preliminary Conclusions

- Complex set of issues
- Confidence and trust matters
- IB system need of joint development and simple technology
- Initialization problem
- NWS-NNWS cooperation



Future Work

- **Within the Initiative:**
 - IB technology: Further development towards Pu-239 detection capabilities.
 - Managed Access Techniques: Identified need for further NWS-NNWS collaboration.
- **Beyond project:**
 - Participate in technical seminars/workshops:
 - F.ex. INMM 51st Annual Meeting, Baltimore, U.S., July 2010.
 - Jumpstart and guide similar projects between NWS and NNWS.

Future Work cont.

- Plan to publish and present findings in a report to the 2010 NPT RevCon!

